

### AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

### COMPLETE LISTING OF THE CLAIMS:

Claims 1-4 : (Canceled)

Claim ~~5~~<sup>1</sup> : (Currently Amended) A phase error detector for generating a phase correction signal to correct a phase difference between a reference frequency of a voltage-controlled oscillator and a carrier frequency of a received signal which is received by a quadrature-amplitude modulated (QAM) receiver, the phase correction signal having a zero-crossing locking point, the received signal having in-phase components and quadrature components in a plurality of decision regions, the phase error detector comprising <sup>a signal receiver, a signal generator, and a processor for processing</sup> a plurality of different algorithms ~~arranged in an order~~; and the phase error detector being operative for successively executing the algorithms in <sup>an</sup> ~~the~~ order, for each of the plurality of decision regions, until the phase correction signal having no additional zero-crossing locking points is generated, <sup>wherein the plurality of different algorithms being stored in the phase error detector, and being</sup> ~~wherein the order of the algorithms~~ <sup>arranged in the order is below:</sup>

~~is:~~

$$S1 = FQ f(ZI) - FI f(ZQ)$$

$$S2 = \pm 2 FQ f(ZI)$$

$$S3 = \pm 2 FI f(ZQ)$$

$$S4 = \pm 2 ZI ZQ$$

$$S5 = 0$$

in which S1, S2, S3, S4, S5 are different phase correction signals, in which ZI and ZQ are the in-phase and quadrature components of the received signal, in which FI and FQ are offsets of ZI and ZQ, in which  $f(ZI) = ZI$  or  $\text{sign}(ZI)$ , and  $f(ZQ) = ZQ$  or  $\text{sign}(ZQ)$ .

Claim<sup>2</sup>~~6~~ : (Currently Amended) The phase error detector of claim  
1/~~5~~, wherein the phase error detector is operative for executing different ones of the plurality<sup>1</sup> of  
algorithms for all of the plurality of decision regions.

Claim 7 : (Canceled)